RAILWAY DEPARTMENT

GOVERNMENT OF INDIA

RAILWAY BOARD

Railways in India

Administration Report for the year

1919-20

VOLUME I

(REPORT)

SIMLA
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The prices of the papers vary from Annas Four to Rupees Eight.

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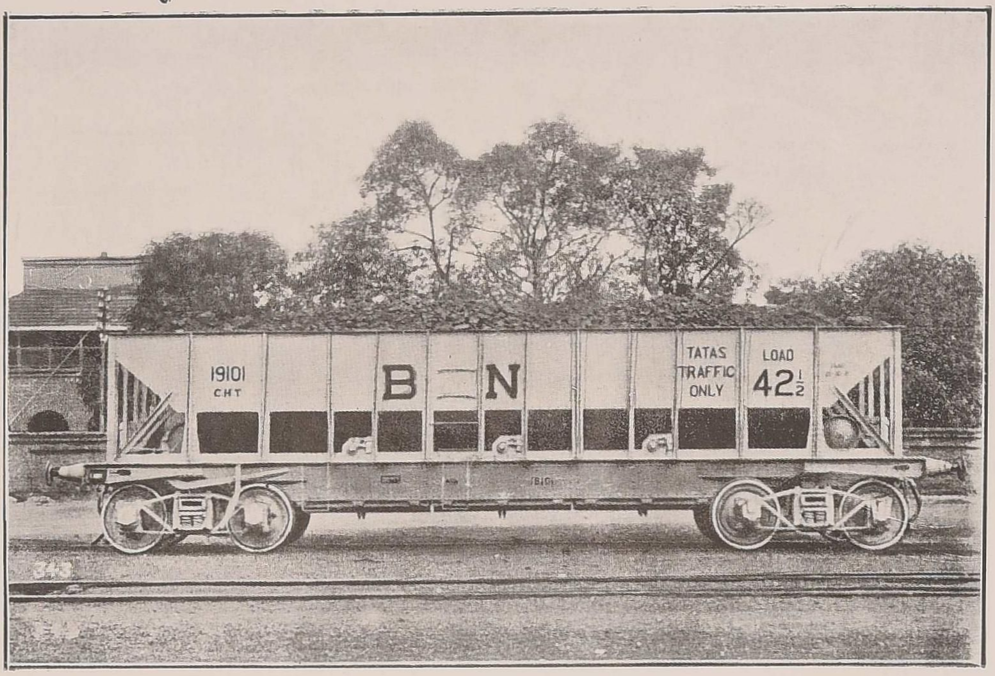
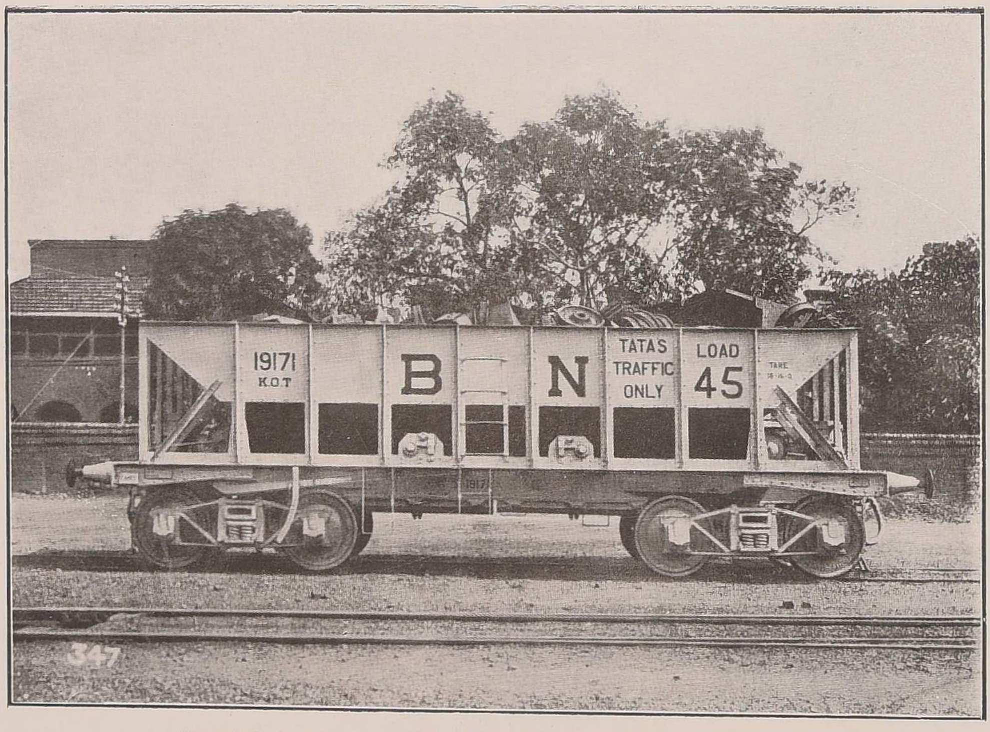


Special Coal Hopper Wagon—Bengal-Nagpur Railway.



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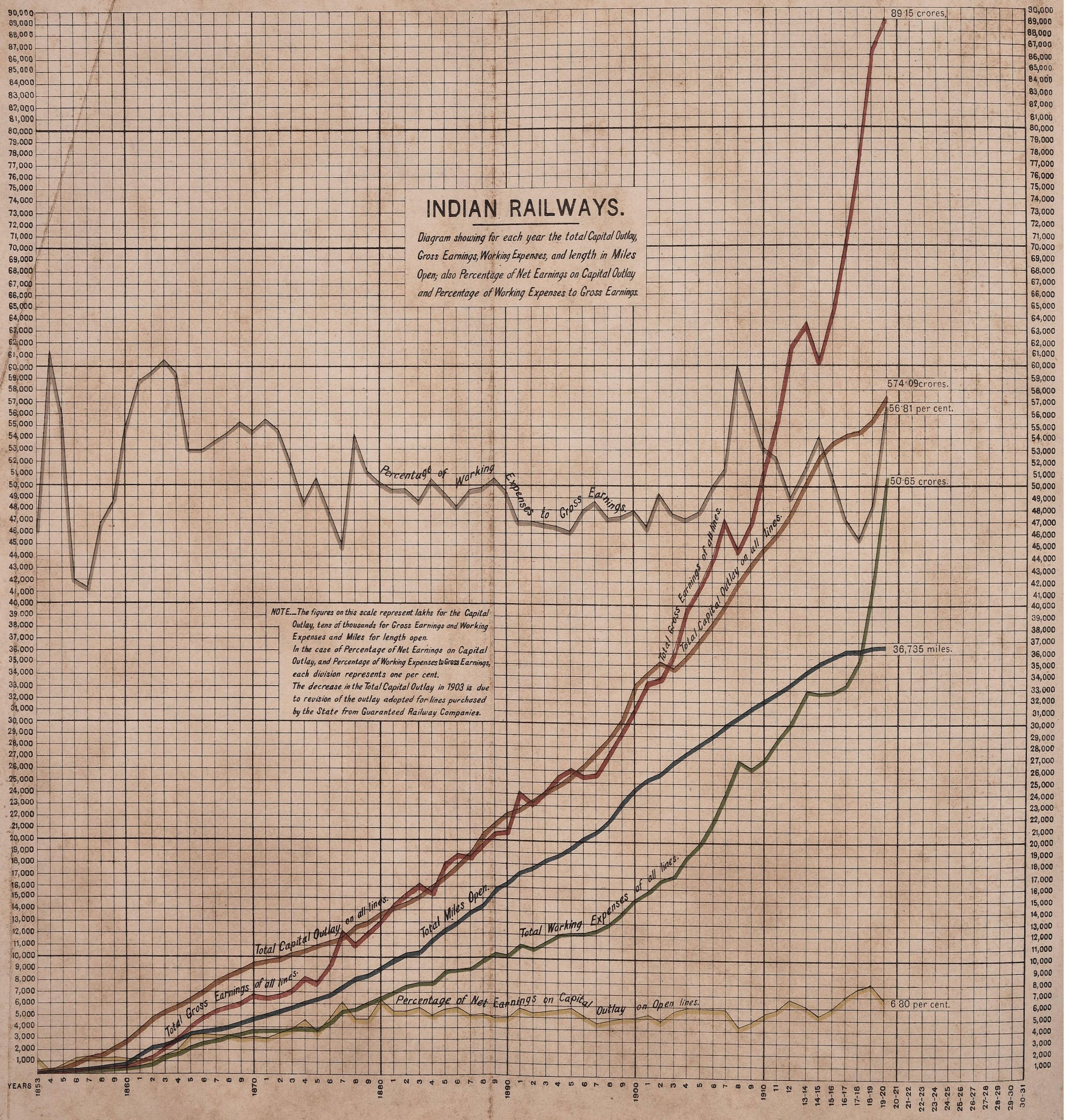
A 2

Note on Indian Currency.

For the information of foreign readers of this report who are unaccustomed to the use of Indian currency and units, it may be mentioned that Rs. 1,00,000 is usually referred to colloquially as "a lakh of rupees." Similarly, 100 lakhs constitutes "a crore."

In previous reports when the standard rate of exchange was Rs. 15 to the pound sterling the lakh was equivalent to £6,666 and a crore to £666,666. With the rise in exchange these valuations have, of course, altered. With effect from the beginning of the official year 1920-21 the standard proposed by the Currency Commission has been adopted by the Government of India and the rate of exchange is now taken at Rs. 10 to the pound sterling, the "lakh" being accordingly the equivalent of £10,000 and the "crore" 1 million sterling.

An anna is a 16th part of a rupee and a pie the 12th of an anna.



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ADMINISTRATION REPORT

ON THE

RAILWAYS IN INDIA

FOR THE YEAR

1919-20

CHAPTER I.

GENERAL.

In December 1919, Colonel W. D. Waghorn, C.B., C.M.G., Agent, North Western Railway, was appointed Member of the Railway Board, and in March 1920 when Sir Arthur Anderson, Kt., C.I.E., C.B.E., proceeded on leave preparatory to retirement he succeeded him as President.

In December 1919, Sir F. D. Couchman, K.B.E., Member, Railway Board, became President of the Stores Purchase Committee; Mr. E. A. S. Bell, C.I.E., Agent, Eastern Bengal Railway, replaced him on the Board.

During the year under review, in spite of the cessation of hostilities between the principal powers, little relief was experienced from the demands on Indian Railways. The Military concentration on the North-West Frontier, labour unrest in Europe, and disturbances in India impeded the improvement and re-equipment of Indian Railways that was hoped for and might otherwise have been expected.

Gross earnings showed an increase over the figures of the preceding year of nearly 3 crores of rupees. On the other hand, the percentage of working expenses to gross earnings increased considerably. This was partly due to the fact that the conditions of service of railway servants were improved by material increases in the scales of wages and salaries; and partly due to the very high prices demanded for materials, essential both for maintenance purposes and for raising the standard of efficiency that had been relaxed during the years of the war. This process of improvement necessarily tends to increase working expenses, and it will no doubt take time to reduce such costs to normal proportions, owing to the amount of lost ground that has to be recovered and to the fact that the available supplies of railway material throughout the world are not at present equal to the demand.

Recent developments of rolling-stock designed to meet special requirements are illustrated on the frontispiece to this volume. The coal and ore wagons there shown have both been built for special traffic connected with the industrial development of the iron and steel trade in this country. The capacity of the coal hopper wagon is 42½ tons and the length over buffers is 41 feet 3 inches. The ore hopper wagon is similar in design with a carrying capacity of 45 tons and a length over buffers of 32 feet 10 inches. Both types of wagons were built by the National Steel Car Company, Limited, of Hamilton, Canada.

In the pocket inside the back cover of this Volume will be found three maps :—

(*i*) The special map referred to on page 19 under the head "Open Line Improvements."

(*ii*) A general map of India showing railways open and under construction on the 31st March 1920.

(*iii*) A map of railway systems in India, Burma and Ceylon, showing each system in a distinctive colour prepared by Mr. J. H. Trott.*

* *Map of Railway Systems in India, Burma and Ceylon by Mr. J. H. Trott.*—This additional map is included only in copies of the report used for official purposes. It may be obtained by the public, on payment, from Mr. J. H. Trott, Aligarh, United Provinces, who holds the copyright.

CHAPTER II.

FINANCIAL RESULTS OF THE YEAR.

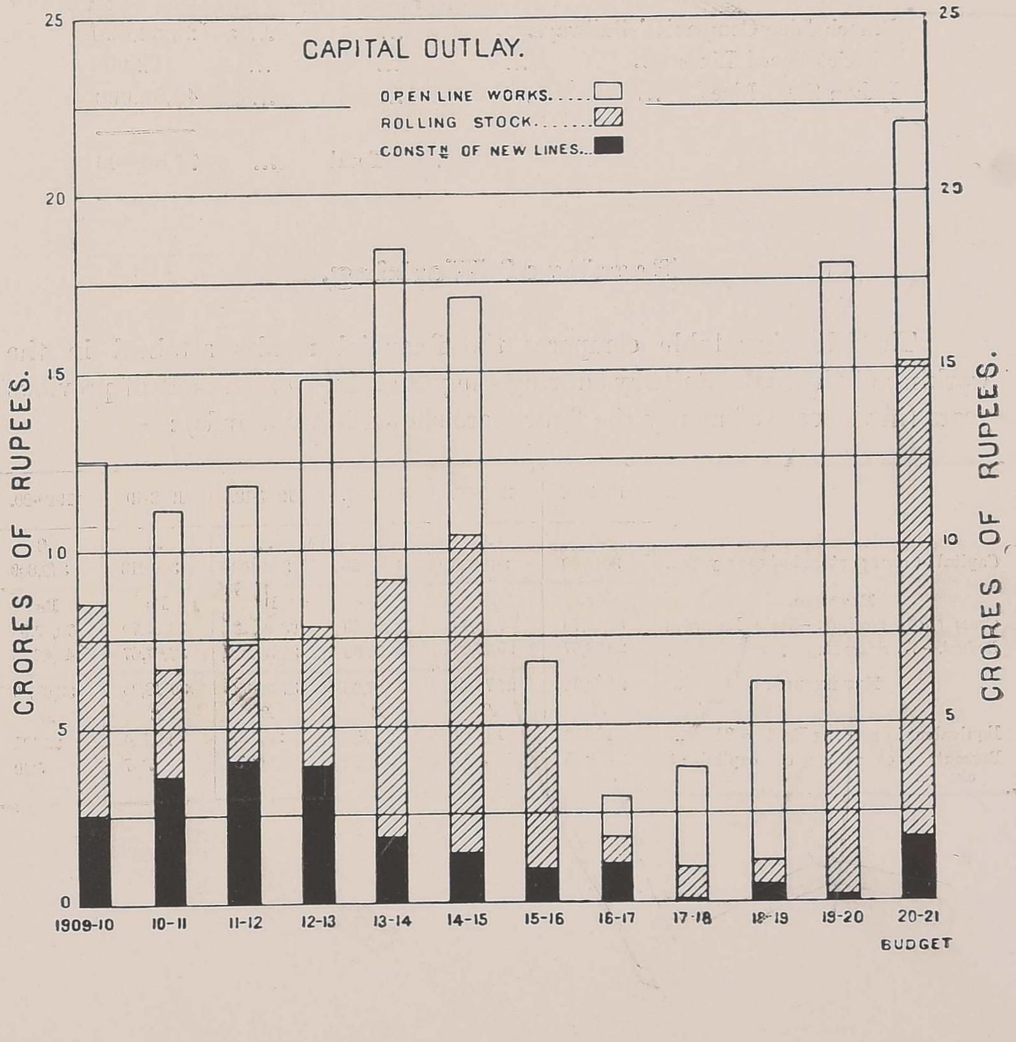
Capital.

The capital outlay incurred by the Government in the purchase and construction of its railways, including the liability which remains to be discharged by means of Annuity and Sinking Fund payments, amounted at the end of 1919-20 to £380,768,116.

2. The outlay incurred during 1919-20 was £12,054,706, distributed as follows:—

	Rs.
Open Line Works (including Suspense)	13,31,01,592
Rolling-stock	4,56,36,000
New Lines	20,83,000
Total ...	18,08,20,592
Equivalent at Rs. 15=£1 to	£12,054,706

The following diagram shows graphically how these figures compare with those of past years. The distribution of the grant of £21·98 millions (Rs. 2,198 lakhs) which has been sanctioned for the financial year 1920-21 is also added for purposes of comparison—



During the year under review, the actual capital expenditure fell short of the sanctioned grant for the year by Rs. 8·48 crores. This lapse was attributable mainly to the credit to the capital account of gain by exchange on sterling outlay in England and to the difficulties attendant on the supply of railway materials from England.

The capital expenditure provided for in the budget for 1920-21 is Rs. 2,198 lakhs (Net). This is again a record figure and is partly accounted for by the heavy liability carried over from the previous year owing to the failure of the supply of English materials in 1919-20. The programme has been designed to provide, as far as possible, for the improvement of traffic facilities, which have been unavoidably deferred during the war and are now urgently required to meet a rapidly expanding trade. It has been possible, therefore, only to spare a small amount for lines in progress and new construction. Provision has, however, been made for the replacement of some of the lines which were dismantled during the war.

The actual capital outlay on railways which have been financed by private enterprise, such as branch lines promoted by Companies, District Board Lines, Indian State Lines, etc., amounted at the end of 1919-20 to Rs. 70,27,66,000. The capital expenditure on such lines during the year was as follows :—

	Rs.
Branch Line Companies' Railways	28,32,000
District Board Lines	22,000
Indian State Lines	49,32,000
Total ...	77,86,000

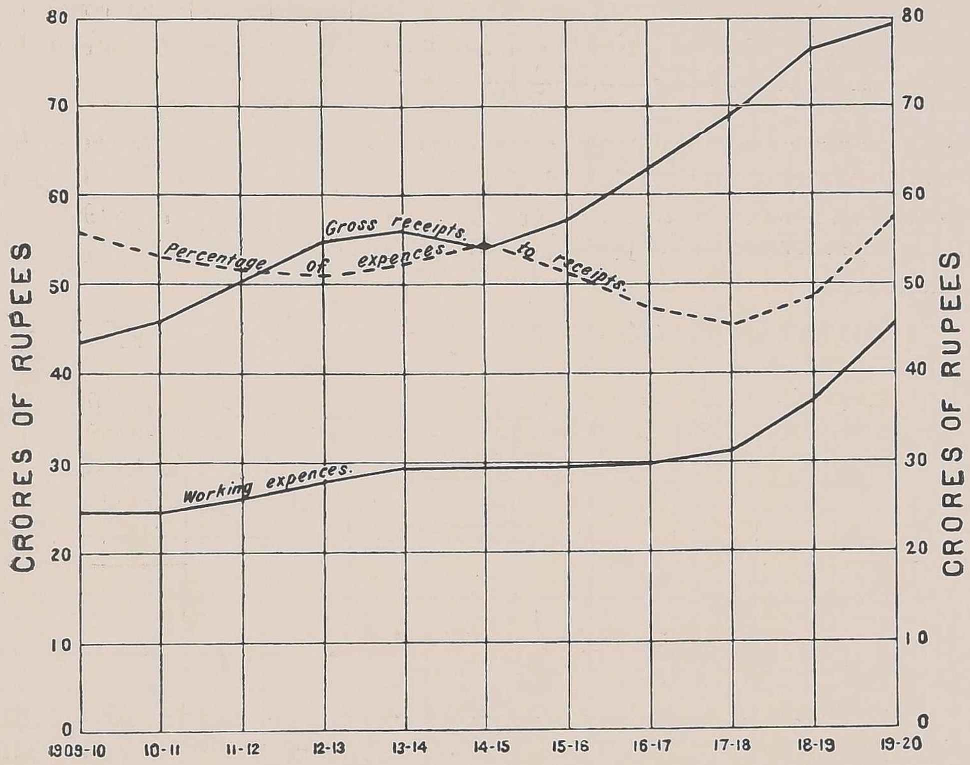
Results of Working.

The following table compares the financial results attained in the working of the State Railways during the year 1919-20 with those of previous years (in the case of money the figures are shown in thousands) :—

	1914-15.	1915-16.	1916-17.	1917-18.	1918-19.	1919-20.
	£	£	£	£	£	£
Capital at charge at end of each year...	361,560	364,858	365,483	366,463	369,213	379,809
Revenue.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Gross traffic receipts.—State Railways	54,15,78	57,26,43	62,94,69	68,92,13	76,25,70	79,09,95
Deduct.—Working Expenses ...	29,52,87	29,53,00	29,96,86	31,35,81	37,07,67	45,46,75
NET RECEIPTS ...	24,62,91	27,73,43	32,97,83	37,56,32	39,18,03	33,63,20
	£	£	£	£	£	£
Equivalent in sterling Rs. 15=£1 ...	16,419	18,489	21,986	25,042	26,120	22,421
Percentage of return on capital at charge.	4·54	5·06	6·02	6·83	7·07	5·90

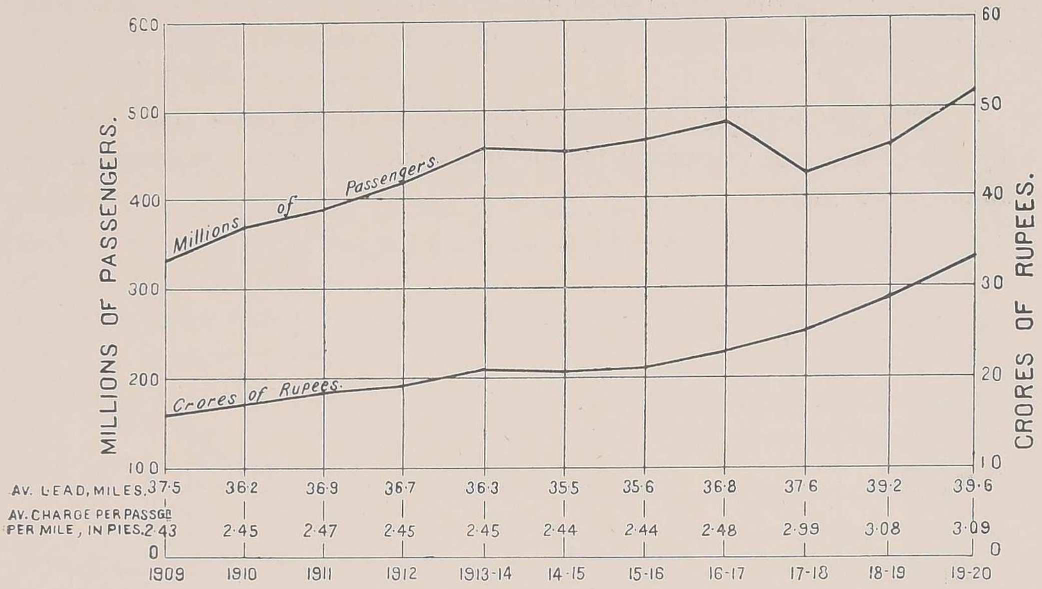
The net working profit from State Railways, after meeting interest and other miscellaneous charges, and certain Annuity and Sinking Fund payments which go to the discharge of debt, amounted in the year 1919-20 to £6,963,817.

The gross receipts and revenue expenditure of the State lines worked by the State and Companies for the past eleven years are compared in the following diagram :—



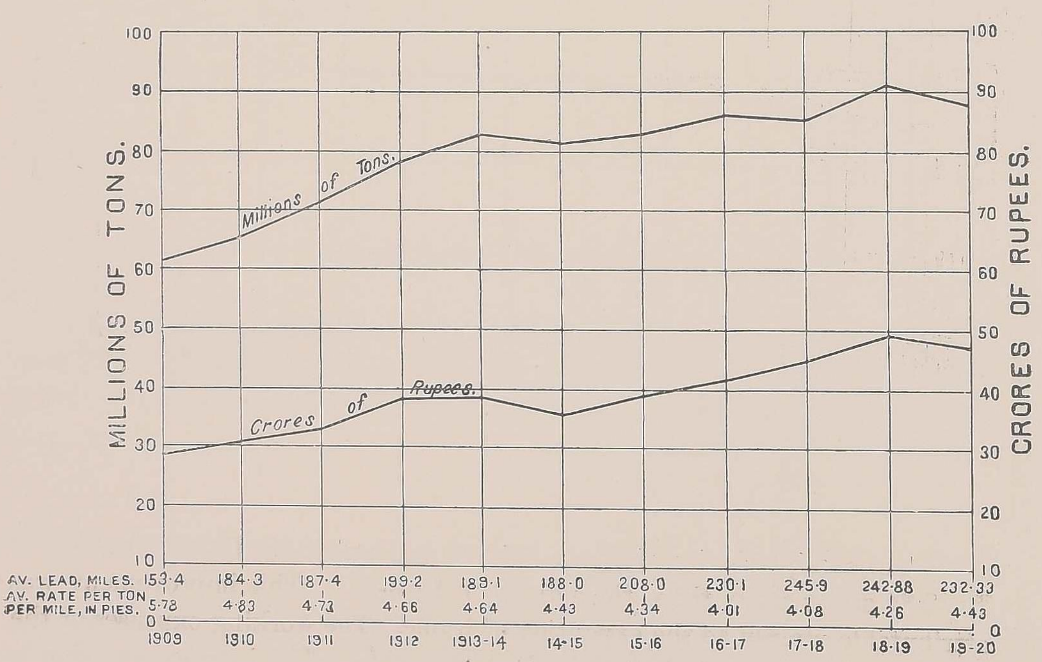
The receipts during the year 1919-20 amounted to Rs. 79·10 crores or Rs. 2·84 crores more than the actuals of 1918-19. This improvement was attributable mainly to the expansion of traffic. The working expenses of the year exceeded those of 1918-19 by Rs. 8·39 crores. The increase was due to a larger programme of special repairs and renewals, to the enhanced scales of pay of all grades sanctioned generally on railways and to the increase in the train-mileage run.

The numbers of passengers carried and the earnings therefrom on all Indian Railways are compared below :—



The increase in the passenger traffic compared with 1918-19 was chiefly due to the general development of traffic after the termination of the war.

The tonnage of, and earnings from, goods traffic are compared in the following diagram :—



The decrease in the goods traffic compared with 1918-19 was partly due to the large falling off in military stores owing to the cessation of hostilities and partly to the smaller traffic in coal, edible grains and sugar.

The gross earnings of railways other than State lines, such as District Boards' lines, Indian State lines, etc., during 1919-20 amounted to Rs. 1,023·88 lakhs, as compared with Rs. 993·37 lakhs in 1918-19, being an increase of only Rs. 30·51 lakhs, and as the working expenses were more by Rs. 35·09 lakhs than the previous year, the net earnings showed a decrease of Rs. 4·58 lakhs, having fallen from Rs. 495·63 lakhs in 1918-19 to Rs. 491·05 lakhs in 1919-20. These net earnings yielded a return on the capital outlay (Rs. 68,50,70 lakhs) on open lines, that is, on mileage earning revenue, of 7·17 per cent. as against 7·36 per cent. in 1918-19.

CHAPTER III.

TRAFFIC WORKING.

The main financial results of the year's working of Indian Railways have been briefly summarised in the previous chapter. In this chapter, matters of unusual or general interest in relation to traffic working are referred to. The year under review, generally speaking, was one of relaxation and withdrawal of the various forms of traffic control which had been introduced to cope with the unprecedented problems connected with the movement of public and military traffic as they arose during the period of the war.

Controller of Traffic and Priority Certificate System.

In September 1919, the Controller of Traffic, whose continuance in office was necessitated by the Afghan War and other difficulties which followed in its train, was relieved of the duties he had assumed in June 1917 under the orders of the Railway Board. The Priority Certificate System,* which had been introduced in June 1918 to enable railways to discriminate between the more urgent classes of Preferential Traffic, was abolished, except in relation to the North-West Frontier, by the end of the year. Owing to the volume of military traffic to and from the North-West Frontier and Baluchistan and the small margin left for the movement of public traffic, it was found necessary to retain the assistance of such certificates to ensure that the available margin was utilized for essential traffic such as food grains.

Military Traffic on the North-West Frontier.

The concentration on the North-West Frontier to meet the disturbed conditions on the Afghan border for a time heavily taxed the resources of the North Western Railway and these had, on occasions, to be supplemented by other railways. Even after the declaration of peace, conditions were very little improved owing to the risings among the Frontier Tribes. Thus it was found necessary to retain, on the narrow gauge lines along the frontier, the engines and rolling-stock commandeered from other sources, and to employ also a considerable portion of the rolling-stock of the North Western Railway for the purpose of transporting troops and military stores as required from time to time.

Coal Traffic.

The appointment of the Coal Controller terminated in April 1919, the necessary portion of his duties being transferred to the Deputy Coal Controller under the new designation of "Coal Transportation Officer, Railway Board." The problem presented by the transport of coal, a matter of vital interest to the industries and railways of the country, continued to play, however, an important part in the congested conditions obtaining on the railways of India. It was abundantly clear that the immediate remedy for improving matters

* More fully described in the Railway Administration Report, Volume I, pages 11 and 12, for 1917-18.

lay in the judicious handling of this section of traffic, on the movement of which more than half of the available wagon supply in the country was at one time engaged.

The absence of shipping in Indian waters greatly increased the difficulties of the problem, because all coal required at the ports of Western and Southern India, which formerly was sent by the sea route from Calcutta, had been diverted to the all-rail route across India. The cargo and bunker coal alone shipped from the Ports of Bombay and Karachi amounted to 468,603 tons during the year or an average of over 2,500 wagons, permanently diverted from the carriage of public coal and merchandise to the provision of this traffic in coal which did not benefit the industries or railways of India. When the other ports of India, such as Madras, are taken into consideration the total number of wagons thus locked up is greatly increased. Towards the end of the year under review, the position became so acute that the Railway Board were obliged to urge proposals for the early re-diversion to the normal route, *viz.*, the rail-*cum*-sea route *viâ* Calcutta, of all coal required for the Royal Indian Marine, Railway and Bunkering purposes. In this way an endeavour was made to release a greater number of wagons for the ordinary merchandise traffic, which had begun to increase steadily with the revival of internal trade.

Increased Rate for Carriage of Coal.

Another important feature was the decision arrived at in January 1920, to raise the rate for the carriage of public coal from the coalfields in Bengal and Bihar and Orissa by approximately 5 per cent. for long distance up to 7½ per cent. for short distance traffic. The existing rates were considered to be sufficiently low to warrant such an enhancement, particularly in view of the abnormal rise in the price of materials and a largely increased wages bill which was resulting in a heavy increase in the working costs on railways.

Passenger Train Service.

The increased military traffic on the North-West Frontier and the coal transportation difficulties alluded to above, which dislocated in no small degree traffic conditions generally, added to the delay in arrival from abroad of materials for railway equipment, and defeated endeavours to revert to the pre-war standard of passenger services. Nevertheless, progress in this direction continued steadily throughout the year till in March 1920 the daily passenger train mileage figures were over 36,000 miles in excess of similar figures for March 1919.

Improvement in Lower Class Passenger's Travel.

The improvement of the conditions of lower class travel has, during the war, not been lost sight of by the railways of India. But, owing to the unfavourable financial position and material difficulties due to the dislocation of the industries and commerce caused by the war, progress in this direction has not been all that could be desired.

Accidents.

The number of persons killed and injured in the working of Indian Railways during 1919-1920, as compared with previous years, was as follows :—

Particulars.			1915-16.	1916-17.	1917-18.	1918-19.	1919-20.
Passengers ...	Killed	By accidents to trains, rolling-stock, permanent-way, etc.	4	15	54	12	85
		By accidents from other causes, including accidents from their own want of caution or misconduct.	243	229	214	331	385
		Total, killed ...	247	244	268	343	470
" ...	Injured	By accidents to trains, rolling-stock, permanent-way, etc.	81	241	237	131	241
		By accidents from other causes, including accidents from their own want of caution or misconduct.	740	858	792	988	1,154
		Total, injured ...	821	1,099	1,029	1,119	1,395
Railway Servants.	Killed	By accidents to trains, rolling-stock, permanent-way, etc.	19	22	40	23	49
		By accidents from other causes, including accidents from their own want of caution or misconduct.	414	403	368	433	401
		Total, killed ...	433	425	408	456	450
...	Injured	By accidents to trains, rolling-stock, permanent-way, etc.	109	138	206	150	223
		By accidents from other causes, including accidents from their own want of caution or misconduct.	687	659	686	692	800
		Total, injured ...	796	797	892	842	1,023
Other persons	Killed	At level-crossings	40	48	44	53	47
		Trespassers	1,315	1,363	1,350	1,335	1,750
		Suicides	256	239	235	274	285
		Miscellaneous	127	81	89	102	169
		Total, killed ...	1,738	1,731	1,718	1,764	2,251
" ...	Injured	At level-crossings	35	39	55	45	32
		Trespassers	425	454	453	483	572
		Suicides, attempted	8	9	8	24	17
		Miscellaneous	68	38	52	72	69
		Total, injured ...	536	540	568	624	690
Total of all classes.	Killed	......	2,418	2,400	2,394	2,563	3,171
" ...	Injured	......	2,153	2,436	2,489	2,585	3,108

The total number of persons of all classes killed by causes beyond their own control was 157 against 66* and the number injured 500 against 332 in 1918-19, the increase was chiefly due to the large number of persons killed in the derailment between Uchhri and Chhab stations on the North Western Railway and the collisions referred to below.

Out of a total of 520 millions passengers travelling 470 were killed and 1,395 injured, while of the former 85 were killed through causes beyond their own control.

The following are particulars of the more important train accidents :—

East Indian Railway.

On the 19th June 1919, a collision occurred between a goods and a passenger train, between Ferozabad and Makhanpur stations on the East Indian Railway, owing to the driver of the goods train having left Ferozabad station with a wrong token.

All the vehicles on the passenger train were lighted by gas; the gas tanks of the three coaches next to the engine were broken as a result of the collision, and the escaping gas becoming ignited set fire to the wood work and inflammable material of the coaches. The wind being favourable, the fire spread down the train until six coaches had caught fire and were burnt.

Five railway servants were killed and 44 passengers and 3 railway servants injured. Owing to the fire it is impossible to give any accurate figures as to the actual number of passengers killed, but it is estimated at about a hundred.

To ensure greater safety in working, certain suggestions made by the committee which assembled to investigate the cause of the collision, have been adopted and others are receiving attention.

The staff at fault were prosecuted and sentenced to various terms of imprisonment.

On the 8th November 1919, another collision occurred on the same railway near Bamangachi station, owing to a light engine having been diverted on to a wrong line through a defect in the electro-pneumatic installation by which the points near Howrah station are worked. The defect in the electro-pneumatic cabling arose through inability to obtain material to replace it during the war. New cables have now been obtained and installed.

Three passengers and one railway servant were killed and 14 passengers and 4 railway servants injured.

* For analysed details the reader is referred to Volume II of this Report, Appendix No. 29.

North Western Railway.

On the 29th June 1919, a collision occurred between a mail and a goods train at Kinana station on the North Western Railway.

Forty-one passengers were killed and 44 injured.

The driver of the mail train was prosecuted, but was subsequently acquitted.

On the 1st September 1919, a mixed train was also derailed on the same line between Uchhri and Chhab stations owing to a land slip on the line.

The rolling-stock was considerably damaged, and 19 passengers were killed and 44 injured.

On investigation it was found that there was no neglect on the part of the railway staff, and that the arrangements for patrolling were satisfactory.

Tezpur-Ballipara Railway.

On the 21st March 1920, a passenger train whilst entering over the points at Rangapara station on the Tezpur-Ballipara Railway was derailed; probably owing to a vehicle with a narrow wheel flange riding the nose of the closed switch rail.

Three passengers were killed and six injured.

CHAPTER IV.

NEW CONSTRUCTION AND ENGINEERING WORKS.

Mileage.

During the year 1919-20, 119·34 miles of railway were opened to traffic bringing the total mileage open (after allowing for dismantlements, and minor corrections due to realignments, etc.) up to 36,735 miles. The additional mileage was made up as follows:—

—	5′ 6″ gauge	3′ 3⅜″ gauge.	2′ 6″ gauge.	2′ 0″ gauge.	Total.
	Miles.	Miles.	Miles.	Miles.	Miles.
State lines worked by the State ...	...	6·25	...	...	6·25
Branch line Companies' railways under guarantee terms, worked by the main line.	...	50·81	...	...	50·81
Branch line Companies' railways under rebate terms, worked by the main line.	13·98	...	...	...	13·98
Unassisted Companies' lines	...	...	20·50	...	20·50
District Board lines	...	22·94	...	...	22·94
Indian State lines worked by Indian States...	...	4·86	...	...	4·86
TOTAL ...	13·98	84·86	20·50	...	119·34

The progress made during the past ten years is summarised in the following table:—

Gauge.	Mileage open at the end of									
	1910.	1911.	1912.	1913-14.	1914-15.	1915-16.	1916-17.	1917-18.	1918-19.	1919-20.
5′ 6″ ..	16,701	17,016	17,189	17,641	17,827	18,060	18,182	17,876	17,994	17,990
3′ 3⅜″ ...	13,530	13,759	14,165	14,389	14,552	14,671	14,806	14,989	15,078	15,181
2′ 6″ ...	1,436	1,632	1,692	2,174	2,402	2,539	2,683	2,839	2,906	2,926
2′ 0″ ...	432	432	438	452	504	563	615	629	638	638
TOTAL ...	32,099	32,839	33,484	34,656	35,285	35,833	36,286	36,333	36,616	36,735

The decrease in the 5′ 6″ gauge mileage during the year 1917-18 was due to the dismantling of the whole of the Sutlej Valley railway and small portions of the North Western, East Indian, Madras and Southern Mahratta and Oudh and Rohilkhand Railways, the materials of which were required by Government in connection with the prosecution of the war; and that in 1919-20 to minor corrections of mileage.

The total mileage under construction, or sanctioned for construction, at the close of the year was :—

—	5′ 6″ gauge.	3′ 3⅜″ gauge.	2′ 6″ gauge.	2′ 0″ gauge.	Total.
	Miles.	Miles.	Miles.	Miles.	Miles.
State lines worked by the State	185·00	...	22·00	...	207·00
State lines worked by Companies ...	480 40	117·37	8·43	...	606·20
Branch line Companies' railways under guarantee terms, worked by the Branch line Companies.	...	...	27·00	...	27·00
Branch line Companies' railways under guarantee terms, worked by the main line.	...	23·30	...	...	23·30
Branch line Companies' railways under rebate terms, worked by the main line.	...	...	92·94	...	92·94
District Board lines	..	68·57	...	...	68·57
Indian State lines worked by Indian States	..	442·20	46·09	56·88	545·17
Indian State lines worked by the main line...	...	153·81	98·45	...	252·26
TOTAL ...	665·40	805·25	294·91	56·88	1,822·44

The rate of progress on most of the new lines comprised in this statement was impeded by the difficulties still experienced in obtaining supplies of the essential materials for their construction. The following paragraphs show the position on some of the more important projects.

Lines Opened During the Year.

Tanjore District Board Railway.

A metre gauge line, 22·94 miles in length, has been built to connect the Tanjore District Board Railway with Vedaraniem, a point on the coast about 5 miles north of Point Calimere, having a small open roadstead used by country craft in fine weather. It is the property of the Tanjore District Board and has been constructed on their behalf by the South Indian Railway Company.

Ambaji-Taranga Railway.

The section of this 2′ 6″ gauge line, from Varetha to Samia, 20·50 miles in length, was opened for passenger traffic on the 6th of December 1919. It is the first portion of a project to connect the frontier station of Varetha, on His Highness the Gaekwar's Mehsana-Taranga Light Railway, with a proposed terminal station at Ambaji about three miles south of the Shrine of "Amba Mata." The line serves a considerable pilgrim traffic to the Holy Shrines at Taranga and Kumbharia, and when extended another 14 miles from Samia will serve the important Shrine at Ambaji. The line was constructed and is worked by the Ambaji-Taranga Light Railway Company.

Panposh-Raipura Railway.

A short branch line, 13·98 miles in length, was commenced in 1916 by the Bengal-Nagpur Railway on behalf of the Panposh-Raipura Railway Company, and was opened for traffic in November 1919. The line was constructed with the object of opening up a new source of supply of lime stone at Raipura for use in connection with the Tata Iron and Steel Company's smelting works at Jamshedpur.

New construction financed by Private Enterprise and District Boards.

The construction of branch lines with capital provided by Companies floated in India and by District Boards or other local bodies is governed by the terms of the Resolutions reproduced in full as Appendices Nos. 30 and 31 of Volume II of this report.* The Branch Line Terms, as they are now generally called, have undergone no change during the year under review, but the question of their revision is one of the matters to come under the consideration of the Indian Railways Committee mentioned in Chapter VII.

As the Branch line terms stand at present, their main feature is the grant by the Government of India of financial assistance to companies or local bodies obtaining concessions for the construction of feeder lines to existing railways in one or other of the following forms :—

(1) a firm guarantee by Government of a return of $3\frac{1}{2}$ per cent. on share capital as actually paid up ;

(2) a rebate paid by the parent line from its net earnings from traffic brought to it by the branch, sufficient to make up a dividend of 5 per cent. on share capital as actually paid up ; the liability of the

*Volume II of this report may be obtained from the Superintendent, Government Printing, India, Calcutta, or his agents. Price Rs. 2 as. 4.

The resolutions referred to, *viz.*, Nos. 457 R. P. of 1913, and $\frac{1894}{56}$-P. of 1915 of the Government of India, Railway Department, can be obtained, on application, from the Secretary, Railway Board, Simla.

parent line being, however, limited to the total of its net earnings from such traffic.

Concessionaries are also given the option, under certain circumstances of raising a portion of their capital under guarantee terms and the remainder under rebate terms ; while in the province of Assam, in consideration of the relatively less developed state of the country and the difficulty experienced in obtaining capital for private railway enterprise under the ordinary terms, it has been provided that the Local Administration may, in approved cases, supplement the Imperial Guarantee of $3\frac{1}{2}$ per cent. described above by the grant from provincial funds of an additional guarantee for a specified term of years of 1 per cent. on the share capital as actually paid up.

No concessions were granted during the year either to companies or to local bodies for the construction of new railways ; but following the policy described in previous reports, the Railway Board have carried on negotiations with branch line promoters in regard to projects which were already either under consideration before the war or have since been put forward. The result has shown that the present branch line terms require considerable revision as most of the projects have had to be held over owing to the inability of promoters to finance their construction under the existing terms and present financial conditions.

Pending, however, the consideration of the whole subject by the Indian Railways Committee, the Railway Board have decided to deal, on their merits, with the more urgent and important projects awaiting construction.

Important Lines Under Construction.

Southern Shan States Railway.

The first and second sections of this railway from Thazi to Aungban was opened for traffic in March 1915. Considerable progress is being made on the construction of the third section from Aungban to Heho. The greater portion of the formation earthwork, together with some masonry work on bridges, was carried out by Turkish prisoners of war during the year. The remainder of the work is now in progress and the laying of rails has commenced.

Itarsi-Nagpur Railway with a Branch to the Pench Valley Coal-fields.

The whole project, 238 miles in length, will, when completed, form part of a direct through North and South broad gauge connection, but as so far constructed, it furnishes an additional outlet for the traffic of the Pench Valley Coal-fields, an important source of coal supply.

The Northern Section, Itarsi to Amla (80·56 miles) was completed and opened for traffic in September 1914. The Eastern Section, Amla to Parasia or the Pench Valley Branch (53·86 miles) was completed and opened for traffic in November 1915.

On the Southern Section, Amla to Nagpur (103·74 miles), the work on tunnels and earthwork is in hand only between Amla and Pandhurna; all other work on this section has been held up owing to the inability at present to provide the necessary funds.

Great Indian Peninsula Railway overhead connection at Bombay.

The construction of the Bombay overhead connection from Tank Bunder on the Bombay Harbour Branch to Victoria Terminus (2·12 miles, double line) was commenced in 1912. The construction involves much heavy work in the heart of the city and the delay in completion is due to the difficulty in obtaining the necessary steel and girder work. When completed, this construction will provide easy and rapid communication between the business centre of Bombay and the cotton market and grain warehouses near Mazagaon.

The Secunderabad-Gadwal Railway.

This line is the property of His Exalted Highness the Nizam's Government, and when completed will link up the metre gauge system of the Hyderabad State with the metre gauge sections of the Madras and Southern Mahratta and South Indian Railways, thus affording an outlet to the Port of Mormugao from the southern parts of the Hyderabad State.

The section from Secunderabad to Wanaparti Road (103·30 miles) have been open to traffic since April 1917. The construction of the further extension is held up due to the present difficulty in obtaining the necessary permanent-way material.

The open sections are being worked by the Nizam's Guaranteed State Railways Company.

Nushki Extension Railway.

The extension of the Quetta-Nushki Railway was started in September 1916. The first 13 miles of line, from Nushki to Ahmedwal, was opened for passenger traffic in April 1919, and a further 101·92 miles, from Ahmedwal to Dalbandin, on the 1st October 1919. The construction of a further extension from Dalbandin to Mirjawa (185·00 miles) is well advanced, and it is anticipated that it will be opened for traffic in 1920-21.

The country passed through is desert but topographically easy, being a series of gentle undulations of sand and shingle merging into stone covered with clay and salty conglomerate.

New Construction in Indian States.

The progress of new construction in Indian States has suffered from the universal shortage in the supply throughout the world of permanent-way materials and rolling-stock.

The following is the only new line sanctioned during the year :—

Mysore.

	Length in miles.
Nanjangud-Hardanhalli (metre gauge)	27·12

The following table gives a complete list of railways which were under construction in Indian States during the year :—

Baroda State.

Railways.	Length in miles.
1. Choranda-Koral (2′ 6″ gauge)	11·68
2. Bhoyani Road-Bechraji (metre gauge)	22·12
3. Motipura-Tankhala (2′ 6″ gauge)	26·29
Bhavnagar.	
Savar Kundla-Mahuva with branch to Port Albert Victor (metre gauge)	54·30
Jaipur.	
1. Palsana-Sikar (metre gauge)	16·80
2. Sikar-Jhunjnu (metre gauge)	39·85
Jodhpur.	
Marwar-Sanderao (metre gauge)	77·83
Junagad.	
Jambur-Una (metre gauge)	37·22
Mysore.	
1. Tadasa-Hebbe (2′ 0″ gauge)	9·58
2. Chickjajur-Chitaldrug (metre gauge)	20·90
3. Shimoga-Arasalu (metre gauge)	26·80
4. Kammangundi-Benkipur (2′ 0″ gauge)	22·80
5. Agasanhadlu-Benkipur (2′ 0″ gauge)	24·50
6. Nanjangud-Hardanhalli (metre gauge)	27·12

The following railways have been held in abeyance during the year for the reasons mentioned :—

The Okhamandal (metre gauge, 37·02 miles) in the Baroda State has been postponed until the construction of the Jamnagar-Dwarka Railway, which has since been sanctioned.

The Anjar-Bachan (2′ 6″ gauge, 23·75 miles) in the State of Cutch, and the Wanaparti Road-Gadwal (metre gauge, 13·45 miles) in the Hyderabad State, have both been postponed owing to the difficulty in obtaining the requisite permanent-way.

Amongst the Indian States which now own railways are :—

Hyderabad (875 miles), Baroda (546 miles), Bhavnagar (206 miles), Gondal (128 miles), Mysore (433 miles), Jodhpur (635 miles), Bhopal (77 miles), Patiala (108 miles), Morvi (93 miles), Junagad (154 miles), Porbandar (41 miles), Kashmir (16 miles), Kolhapur (29 miles), Bikaner (498 miles), Rajkot (4 miles), Jetpur (8 miles), Cooch Behar (33 miles), Gwalior (474 miles), Mewar (67 miles), Navanagar (54 miles), Rajpipla (39 miles), Dhrangadra (40 miles), Kotah (37 miles), Parlakimedi (25 miles), Cambay (12 miles), Maler Kotla (45 miles), Jind (59 miles), Cochin (65 miles), Travancore (96 miles), Cutch (37 miles), Jaipur (122 miles), Mourbhanj (32 miles), Dholpur (52 miles), Sangli (5 miles), Bahawalpur (22 miles) and Chhota Udaipur (11 miles).

The total mileage of railways in Indian States open to traffic at the close of the year was 5,178 miles distributed between the various gauges as under :—

	Miles.
5′ 6″ gauge	962
3′ 3⅜″ or metre gauge	3,318
2′ 6″ gauge	596
2′ 0″ gauge	302

Open Line Improvements.

During the year, owing to the difficulties in obtaining the requisite materials, no large new schemes were undertaken by Railway Administrations except such works as were essential to meet the increasing volume of traffic carried by Indian Railways. The special map which accompanies this report shows where the larger open line works were in progress during the year.

Improvements Undertaken or Approved.

The following are some of the more important improvements that have been undertaken or approved on the main railway systems during the year.

On the Bengal-Nagpur Railway; the provision of additional crossing stations; a loop line from Kargali to Anara; and doubling and regrading the main line from Sini to Manharpur.

On the Madras and Southern Mahratta Railway; the provision of additional crossing stations; increasing the capacity of the Gadag-Castle Rock section; and the provision of a marshalling yard at Tondiarpet station.

On the East Indian Railway; a link or avoiding line between the Grand Chord and the main line at Sitarampur; lengthening loops and passing sidings on the Allahabad-Tundla section; doubling the Grand Chord, and the construction of the Katrasgarh-Phularetand link.

On the Great Indian Peninsula Railway; the remodelling of stations at Poona and Itarsi Junctions; and the doubling of the Nagpur-Wardha section.

On the Bombay, Baroda and Central India Railway, the quadrupling of the suburban section from Bandra to Barioli.

Train Control.

Extensive additions to the system of train control on the congested sections of several of the main lines of India are of importance for the more efficient handling of the traffic, but their extension has been greatly restricted by the difficulties encountered in obtaining the requisite instruments and wire.

Closing of the Bombay, Baroda and Central India Railway south of Church Gate Station to Colaba (Bombay).

In order to release land, occupied by the Bombay, Baroda and Central India Railway, for building sites in connection with the reclamation and housing scheme in the Colaba area of the city of Bombay which is under the consideration of the Local Government, it has been decided with the approval of the Secretary of State for India to—

(*a*) remove the present goods yard at Colaba to Sewri, as soon as requisite arrangements can be made to handle cotton and other produce at the latter station;

(*b*) transfer the present long distance terminal traffic from Colaba to Grant Road, and the local suburban passenger traffic to Church Gate station, as soon as the necessary new works at the latter station have been completed. When these new arrangements have been brought into operation the line south of Church Gate station will be abandoned.

Railway facilities for the New Capital at Delhi.

A re-arrangement of the railway lines and junction arrangements in the Delhi area, with a view to meeting the traffic conditions set up by the location and the growth of the new capital, have been under the consideration of the Government of India for some time past.

A scheme comprising various proposals has been drawn up by a committee on which all the interests involved were represented. These proposals were submitted to the Secretary of State for India and his approval to the general scheme has been obtained. The complete programme for carrying out this scheme is dependent upon the further development of traffic requirements and will be subject to review as occasion arises. The diversion of the Agra-Delhi Chord Railway as a first step has been commenced. It is also intended to commence work on the provision of a road-side station to serve the new capital area and eventually to form part of the new interchange passenger station.

Chittagong Harbour.

Owing to the inability of the Port Commissioners of Chittagong to provide the funds necessary for the desired development of the port, and the Local Government being also unable to give them adequate assistance, the Government of India have decided, with the approval of the Secretary of State for India, to take over the control of the port and to entrust the management, as a provisional measure, to the Assam-Bengal Railway Company, assisted by a Harbour Board. Legislation to effect the transfer of the control of the harbour is to be undertaken as soon as possible.

Pazundaung Creek Bridge, Burma Railways.

The Pazundaung Creek Bridge, which was reported to be in a dangerously precarious state last year, has since had to be closed to traffic. Plans and estimates for its renewal have been prepared, and it is anticipated that the work of building a new bridge will commence shortly. In the meantime, traffic is being worked over the Togyaunggale-Dawbong Lift Bridge loop mentioned as under construction in last year's report and since opened.

North and South Bassein Bridges, Bombay, Baroda and Central India Railway.

The contemplated replacement of the North and South Bassein Bridges on the Bombay, Baroda and Central India Railway main line near Bombay had to be postponed during the war. Recently, the deteriotated condition of the bridges has become so pronounced that it has been decided to undertake their renewal without further delay and preliminary work has been commenced.

Damages to Works.

Damages by Floods, Fire, and Tribal Raids.

During the year under review, Indian Railways have suffered more than usual from troubles due to floods and fire, and along the North West Frontier by enemy action and tribal raids.

The frontier sections of the North Western Railway were damaged in several places by floods during the month of July, resulting in interruption of traffic from one to ten days. Near Gulistan on the 31st July 1919, an ambulance train ran into a breach and the engine and two bogie carriages were badly damaged. Casualties occurred among railway employees only and amounted to seven killed and five injured. The approximate cost of the damages to the rolling-stock and the permanent-way amounted to a lakh of rupees.

Four bridges between Kanmehtarzai and Hindubagh as well as several offices and quarters at Hindubagh on the Khanai-Hindubagh Railway were burnt during a raid by the local tribes. The damage thus caused was increased by the action of subsequent floods. Work on repairs had to be carried out under armed escorts and was necessarily slow.

On the 8th August 1919, heavy rain fell in the neighbourhood of Sutna, where nearly 17 inches of rain were recorded. On the Jubbulpore Branch of the East Indian Railway the embankments were seriously damaged, nearly a mile being washed away, and the track swept down stream and completely turned over. Fortunately, no bridges were damaged though the necessary repairs to restore railway communication took nearly a month to effect, at the cost of a lakh of rupees.

On the 11th August 1919, floods breached the Aligarh Branch of the Cudh and Rohilkhand Railway for a length of nearly 700 feet including some bridging. Traffic was interrupted for a fortnight and the repairs cost seventy thousand rupees.

The cyclone, accompanied by heavy raiu, that passed over Bengal and Assam on the 24th September 1919 caused considerable damage to buildings, signals and telegraphic communication on the Eastern Bengal and Assam-Bengal Railway systems. Several small craft and three steamers were sunk at the ferries, two of the latter belonging to the Assam-Bengal Railway and the other to the River Steam Navigation Company. Two trains were also blown over and vehicles capsized at several stations on the Assam-Bengal Railway. Fortunately, there was no loss of life on either of these systems.

The cost of the damage incurred was about Rs. 38,000 on the Eastern Bengal Railway and over Rs. two lakhs on the Assam-Bengal Railway.

A fire broke out in a jute shed at Cossipore Road Station of the Eastern Bengal Railway on the 7th May 1919. The fire took five hours to bring under control and caused damage estimated at a lakh of rupees. The cause of the outbreak was not discovered.

On the 19th September 1919, the Central Stores and several stacks of timber were destroyed by fire at the Locomotive Workshops of the South Indian Railway at Negapatam. The committee of enquiry came to the conclusion that although no cause of the outbreak was discoverable it was not accidental.

CHAPTER V.

ROLLING-STOCK AND MATERIALS.

Construction of Rolling-stock in India.

At the beginning of the year under review, there were still 2,000 broad gauge covered goods wagons to be completed out of those previously ordered for construction in India. Out of these, 1,000 have been delivered leaving 1,000 to be delivered during the current year. Arrangements were made for the erection in private workshops of 5,000 wagons received from America. Of these, 900 are to be covered goods wagons with wooden bodies of which 230 were completed during the year. The remaining 4,100 are to be high-sided open wagons for the coal traffic ; the erection of these is now being pushed forward as the requisite steel sheets are arriving in India.

New Rolling-stock.

Large orders for new stock were placed at the conclusion of the Armistice, but owing principally to labour difficulties in the United Kingdom, delivery of a considerable proportion of these orders was thrown forward into the following year.

Additions to the Rolling-stock of Railways.

The general position as regards additional rolling-stock is summarised below. As regards engines, 364 additional engines were on order during 1919-20 of which 43 were placed on the line, leaving a balance of 301 to be completed. Turning to goods stock 14,157 additional vehicles, were on order during the year of which 3,653 were placed upon the line, the balance being carried forward for delivery during the current year. The figures for coaching stock are more modest, out of a total on order of 699 additional vehicles, 69 were placed on the line, leaving a balance of 630, to be delivered during the following year.

Thefts of Railway Fittings.

As mentioned in last year's report, the difficulties in maintaining rolling-stock have been aggravated by the widespread thefts of detachable parts of wagons. By some railways a marked decrease is reported in the number of these thefts in certain areas, but the position elsewhere is far from satisfactory.

Standardization of Rolling-stock.

The Special Committee of Carriage and Wagon Superintendents completed the preparation of designs for a series of standardized broad and metre gauge vehicles. Sample wagons of these designs have now been erected, both in India and England, for examination from the manufacturers' point of view.

Standardization of Permanent-way.

Following on the decision to adopt British standard rail sections for all new lines and for extensive renewals, where new rails are used, as mentioned in the report for last year, the question of standardizing fish plates and other fittings has been receiving consideration, but no final decisions have yet been arrived at.

Cold Storage and Transportation.

The transportation during the hot weather of perishable commodities, particularly of fish and fruit, staple diets of a large proportion of India's population, has led to the production of an efficient type of cold storage van. Further progress in the matter of cold storage equipment, however, is dependent upon the installation at terminal stations of adequate cold storage depots. Efforts are being made to induce local authorities to establish experimental installations at some of the more important stations.

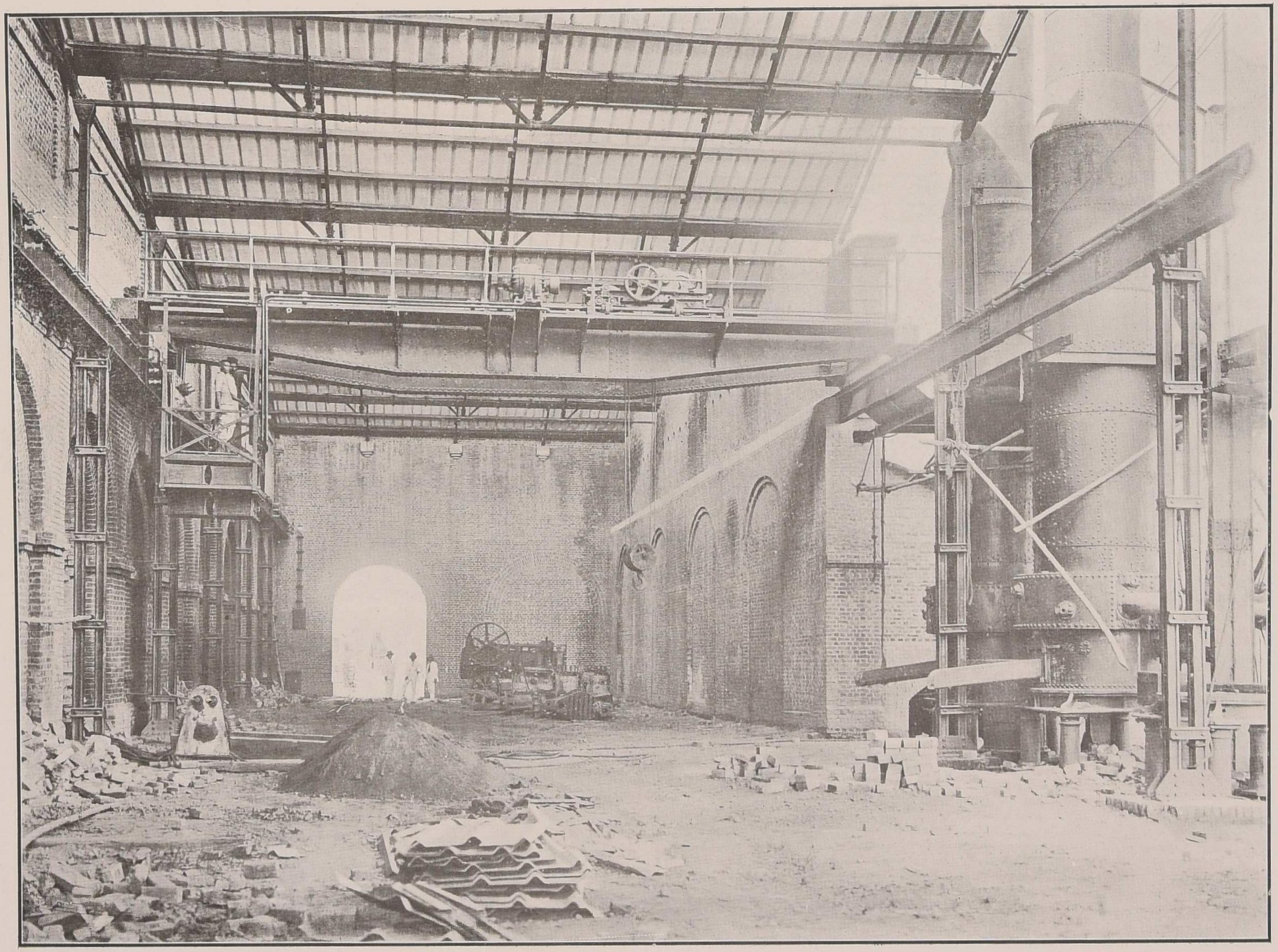
Maintenance of Rolling-stock.

During the war, workshop facilities for repairs of rolling-stock gradually deteriorated in efficiency as well as being hampered by the amount of war work undertaken over and above the ordinary work of each railway. The beginning of the year under review found the railways struggling with weakened facilities against heavy arrears and a heavy programme for the erection of new stock. Considerable improvement took place during the year, but it will take some time to restore old rolling-stock to the pre-war standard. In the meantime, the improvement of rolling-stock and repair facilities is being given a foremost position in the railway programmes. The new smithy and foundry sanctioned in 1917 to be constructed at the workshops of the Eastern Bengal Railway at Kanchrapara as mentioned in the report for 1917-18 are nearing completion. The illustration reproduced gives a general view of the new iron foundry showing the new 10-ton electric travelling crane and two of the cupolas both of which were designed and built at Kanchrapara.

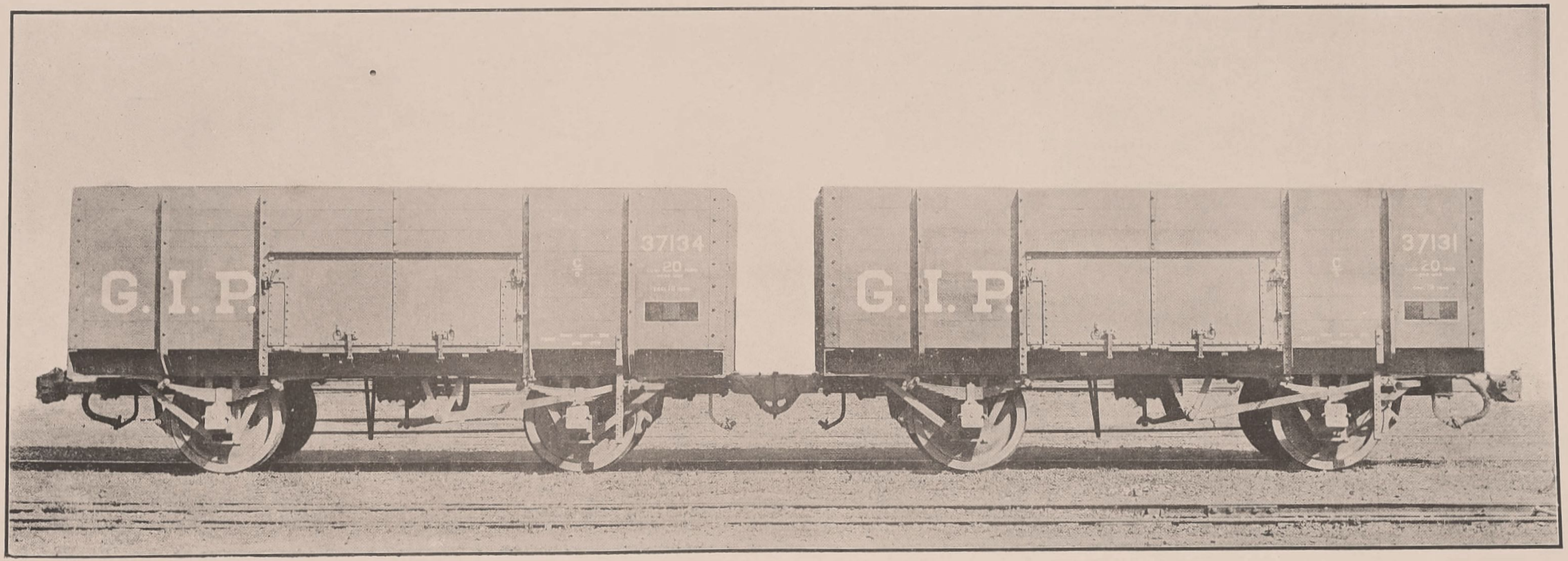
Central Automatic Couplers on the Broad Gauge.

The Railway Board have been considering the question of the introduction of a central automatic coupling on the broad gauge in place of the existing screw coupling and side buffers. The advantages to be obtained are an increase in the strength of coupling permissible, a saving in time in wagon movements and increased safety for the shunting staff. On the other hand, the heavy cost of the improvement and the difficulties in making the change make a very careful investigation necessary before a decision can be arrived at. Two railway officers were deputed to report on how the problem had been dealt with in Australia and their report has been received and is under consideration.

In the meantime, the Great Indian Peninsula Railway is continuing expriments with this form of coupling. The illustration shows a pair of rebuilt



New Iron Foundry—Eastern Bengal Railway.



Rebuilt Wagons on the Great Indian Peninsula Railway, coupled with "Simplex" Automatic Central Couplers.

wagons equipped with "Simplex" couplers. These wagons have had their underframes strengthened and the couplers are capable of being used on trains of about double the weight of any now running in this country.

CHAPTER VI.

FUEL.

Coal Mined in India.

In 1919, the coal mined in India amounted to 22,628,037 tons against 20,722,493 tons in 1918. Despatches of coal by the East Indian and Bengal-Nagpur Railways from the coal-fields of Bengal and Bihar and Orissa exceeded those of the previous year by 16,967 tons.

The total quantity of coal despatched from the main coal-fields of India is as follows :—

				Tons.
Bengal, Bihar and Orissa collieries		...	...	15,524,397
Singareni	,,	...	...	543,386
Pench Valley	,,	...	...	257,895
Umaria	,,	...	...	157,151
Total despatched by rail			...	16,482,829

Cargo and Bunker Coal.

Including bunker coal, shipments from the port of Calcutta to Indian and Foreign ports in 1919-20 amounted to 1,817,950 tons as compared with 1,632,916 tons in 1918-19 and 901,125 tons in 1917-18 and 1,999,657 tons in 1916-17. Cargo and Bunker coal shipped from the port of Bombay amounted to 304,851 tons and from the port of Karachi to 163,752 tons during 1919-20.

Tonnage of Coal Inspected by the Coal Department.

The State Railways Coal Department inspected 7,890,374 tons of coal in 1919-20 as compared with 7,857,485 tons in 1918-19. During the year under review public shipment coal was supplied from stocks held on account of the Admiralty.

Government Requisition of Coal.

The Government requisition of coal was withdrawn with effect from the 1st April 1920.

Pulverised Coal.

The question of utilising, for railway purposes, certain classes of inferior coals available in India is engaging attention. Experiments with pulverised coal have been continued by the Great Indian Peninsula Railway during the year. The results attained so far, however, do not at present justify the formulation of any definite conclusions.

Oil-Fuel.

The regular use of oil-fuel for locomotives on certain sections of the Great Indian Peninsula and of the North Western Railways continues. At the end of the year under review, there were on the North Western Railway 129 engines burning oil-fuel and a storage capacity of 19,300 tons of the same fuel on the Karachi District.

CHAPTER VII.

MISCELLANEOUS.

Indian Railways Committee.

In their report for the year 1918-19, it was stated that a Committee would investigate and report on questions relating to the administration of railways in India during the winter of 1920-21. This matter is still under consideration.

Indian Railway Bridge Committee.

Since last year, the Indian Railway Bridge Committee have continued their investigations, a record of which is embodied in their third report* which was drawn up at a meeting in Delhi in December 1919. The investigations of the Committee, which owed its inception to the Inchcape Conference of 1912, are divided under two heads :

(*i*) revision of the rules for calculating stresses ;

(*ii*) standards of loading.

Under head (*i*) the final drafting of the rules depends upon the results of experiments on "Impact" which are now being conducted. During the past year, the investigating officer, in collaboration with various members of the committee, carried out numerous preliminary experiments, with such instruments as were available, which are described in detail in the notes attached to the third report, but work has been delayed owing to the non-receipt of certain special instruments expected from England and America. So far as head (*i*) is concerned, therefore, the present must be regarded as an "interim" report only, in which criticisms from various authorities on the provisional draft rules issued with the second report have received consideration. Under head (*ii*) the most important recommendation in the present report is that three standards of loadings should be recognised for both the broad and metre gauges, namely—

(*i*) standard B of 1903, to be henceforth designated Standard I,

(*ii*) the standard of 1908, which is equivalent to standard B *plus* 25 per cent. to be designated Standard II,

(*iii*) the Bombay, Baroda and Central India standard of 1916 equivalent to standard B *plus* 65 per cent. (average) on the broad gauge, and standard B *plus* 78 per cent. (average) on the metre gauge

* The "Third Report of the Indian Railway Bridge Committee" will be published shortly and will be obtainable from the Superintendent, Government Printing, 8, Hastings Street, Calcutta.

(the actual percentages depending on the effect of hypothetical type engines and trains on different spans) to be designated Standard III.

To admit of the design of specially heavy engines for ghât working, the recommendations include also provision for an excess over the above loadings to be specially sanctioned by the Railway Board to meet particular cases.

The work of the Committee is not yet complete, and they do not attempt to specify how the various standards should be applied ; but the latter are based on the recognition that lines of light traffic do not require the same standard as important main lines on the same gauge, provided that the lightest lines will freely take types of loaded wagons in most general use in the ordinary course of traffic without break of bulk, while locomotives of particular types may be restricted to particular runs. The various recommendations made by the Bridge Committee will be considered in due course on completion of their experiments and reports.

Railway Technical Section.

The Technical Section of the Railway Department which was started in 1887, abolished in 1905 on the first formation of the Railway Board, and revived in 1917 with the publication of the first report of the Indian Railway Bridge Committee, continues to issue papers periodically under the direction of the Chief Engineer with the Railway Board. These papers* are unofficial, but are intended for the guidance of railway officers in the scientific study of their profession and comprise (*a*) Original descriptions of railway works and studies of railway problems in India and elsewhere, (*b*) Reprints of articles from Foreign Engineering Magazines and (*c*) Reprints or abstracts of reports received by the Government of India on subjects connected with railways.

The papers have hitherto been chiefly engineering in character, but locomotive, traffic and administrative problems are also dealt with, the aim being to encourage the railway officers to study the scientific principles of railway transportation in all its aspects, with special reference to Indian conditions.

Sleeper supply.

The question of maintaining the supply of sleepers both for renewals and for new construction is yearly becoming more acute. Supplies in India of hard wood sleepers, that can be used without any special treatment, are limited and experiments are encouraged with other types of sleepers made of

*A complete list of the papers can be obtained gratis from the Chief Engineer with the Railway Board, Simla. The books and papers can be bought from the Superintendent, Government Printing, India, 8, Hastings Street, Calcutta.

various materials to ascertain substitutes for hard wood sleepers that will be satisfactory under Indian conditions.*

Utilization of Indian Soft Woods.

As mentioned in last year's report, it was hoped that the creosoting plant on the North Western Railway for the treatment of Indian soft woods to render them suitable for sleepers would be completed during the year. This hope was not realised owing to the inability of the supplying firm to deliver the requisite plant during the year. Arrangements are in hand for treating 300,000 sleepers annually, in the first instance.

Concrete Sleepers.

Various types of reinforced concrete sleepers are under trial, but these are for the most part still only in the experimental stage.

Aerial Ropeways.

The Railway Board in pursuance of their intention, mentioned in last year's report, to have an engineer trained to act as an inspector of aerial ropeways, deputed an officer to Europe and America for this purpose.

Labour Unrest and Strikes.

During the year under review, the continued labour unrest amongst railway employees resulted in a number of strikes. The economic situation and the general unrest after the war gave rise to these outbreaks, but in the majority of cases the workmen ceased work without informing those in authority what their grievances were. Strikes of importance occurred on the Bengal and North-Western, Rohilkund and Kumaon and East Indian Railways. That which occurred at the Jamalpur shops of the East Indian Railway resulted in some 10,000 workmen staying out from the 1st December 1919 to the 15th January 1920 when the men resumed work unconditionally.

Increase of Wages and Concessions to Staffs.

As a result of the rise in the cost of living, wages went up all over the country during the year,—though in some localities more than in others, and the grant of increased pay or of special temporary allowances was, as a consequence, general on railways. The increases given to the lowest paid establishments were in many cases 50 per cent. over pre-war rate, other grades benefitted in proportion.

In view of the high rates of pay prevailing in England, the case of covenanted mechanics had specially to be considered, and with a view to adding to the attractions of the Indian Railway service, in October 1919, the Secretary of State, on the recommendation of the Government of India,

*The most recent Technical Section papers on the subject of sleepers are No. 196 "Treatment of wood sleepers," and No. 203 "Notes on cast iron sleepers," "Notes on concrete sleepers" and "Notes on the comparative economy of different types of sleepers," are now under preparation. Technical Section papers may be obtained on payment from the Superintendent, Government Printing, India, Calcutta.

authorised the grant by railways of free passages to covenanted subordinates and their families for journeys on first appointment and on retirement, and also to the grant of free passages both ways to men (only) of this class who should be invalided to England to recover their health.

Notes on the Relation of the Government to Railways in India.

(*Reprinted from the Report for 1914-15.*)

Diversity of Relations Between the State and Railways.

One of the special features of the Indian Railway system is the diversity of conditions that prevails in the relation of the State to the various lines in respect of ownership and control. Of the important lines situated in British India or in which the Government of India is interested, three (the North Western, Eastern Bengal and Oudh and Rohilkhand Railways) are owned and worked by the State; eight (the East Indian, Great Indian Peninsula, Bombay, Baroda and Central India, Madras and Southern Mahratta, Assam-Bengal, Bengal-Nagpur, South Indian and Burma) are owned by the State but worked on its behalf by companies enjoying a guarantee of interest from the Government; three important lines (the Bengal and North-Western, Rohilkund and Kumaon and Southern Punjab) and many of less importance are the property of private companies, some being worked by the owning companies and some by the State or by the companies that work State-owned systems; several minor lines are the property of District Boards or enjoy a guarantee of interest granted by such Boards.

The diversity of conditions is in certain respects less important than might at first appear for the following reasons:—

The Government of India exercises under the Indian Railways Act, 1890, in respect of all railways in British India (and also, by virtue of arrangements with Indian States, in respect of the chief railways passing through such States), certain general powers. Thus a railway may not be opened until a Government Inspector has certified that it has been constructed so as to comply with requirements laid down by the Government and can be used for the public carriage of passengers without danger to them. The Government of India can also, in the interest of the safety of passengers, require a railway to be closed, or the use of particular rolling-stock to be discontinued, or may prescribe conditions for the use of the railway or the rolling-stock. They can appoint a Railway Commission to investigate complaints on certain matters such as the withholding of reasonable traffic facilities or the grant of undue preference.

In addition, the Government of India (or in some cases Local Governments) exercise under the provisions of contracts detailed control over the management of all Railways in British India greatly exceeding that which is secured by the Indian Railways Act. They also have a certain financial interest in all companies in British India, and a preponderating interest in most of the railways which are of the first importance.

History of Relations of the Government and Companies.

The main causes which have led to the present diversity of conditions in regard to the agency by which railways are managed, and the relations of the Government with the various classes of companies now in existence, are summarised in the following paragraphs:—

The first proposals for the construction of railways in India were submitted in 1844 to the East India Company in England by Mr. R. M. Stephenson, afterwards Chief Engineer of the East Indian Railway, and others; they included the construction of lines by railway companies to be incorporated for the purpose and the guarantee by the East India Company of a specified return. A contract for the construction by the East Indian Railway Company of

an experimental line of 100 miles from Calcutta towards Mirzapore or Rajmehal at an estimated cost of 1,000,000*l*. was made in 1849, and a return of 5 per cent. was guaranteed by the East India Company on the Capital; and a similar contract was made in the same year with the Great Indian Peninsula Railway Company for a line from Bombay to Kalyan at an estimated cost of 500,000*l*. But the policy of entrusting generally the construction of Indian railways to guaranteed companies was not adopted until 1854 on the recommendation of Lord Dalhousie, who, in a minute, dated 20th April 1853, explained his reasons for preferring the agency of companies, under the supervision and control of the Government, to the construction of lines on behalf of the Government by its own officers. He held that the State Engineer officers would make railways as well, and possibly as cheaply, and as expeditiously as companies; but that the withdrawal from other duties of the large number of officers required would be detrimental to the public interest, that the conduct of commercial undertakings did not fall within the proper functions of any Government and least of all within the functions of the Government of India, since the dependence of the population on the Government was, in India, one of the greatest drawbacks to the advance of the country, and that the country would therefore benefit by the introduction of English energy and English capital for railway purposes, with the possibility that such energy and capital would in due course be encouraged to assist in the development of India in other directions.

Old Guaranteed Railways.

The policy supported by Lord Dalhousie was adopted, and between 1854 and 1860 contracts for the construction of Railways in India were made by the East India Company, or (after 1858) by the Secretary of State for India with the East Indian, Great Indian Peninsula, Madras, Bombay, Baroda and Central India, Scinde (afterwards the Scinde, Punjab and Delhi), Eastern Bengal, Great Southern of India (afterwards, when amalgamated with the Carnatic Railway Company—see below—the South Indian) and Calcutta and South-Eastern Railway Companies—Under these contracts the railway companies undertook to construct and manage specified lines, while the East India Company (or the Secretary of State for India) agreed to provide land and guaranteed interest on the capital, the rate fixed being in various cases 5, 4¾ and 4½ per cent. according to the market rates prevailing when the various contracts were made. Half of any surplus profits earned was to be used towards repaying to the Government any sums by which it had been called upon to supplement the net earnings of any previous period in order to make good the guarantee of interest; and the remainder was to belong to the shareholders. In practically all matters of importance, except the choice of staff, the companies were placed by the contracts under the supervision and control of the Government, which had power to decide on the standard and details of construction; the rolling-stock to be provided, the number, time and speed of trains; the rates and fares to be charged; the expenditure to be incurred; the standard of maintenance; and the form of accounts. The railways were to be held by the companies on leases terminating at the end of 99 years, and on such termination the fair value of their rolling-stock, plant and machinery was to be paid to them. But provision was also made to enable the Government to purchase the lines after 25 or 50 years on terms calculated to be the equivalent of the companies' interests therein, and also to enable the companies to surrender their lines to the Government and to receive in return their capital at par.

Early Attempts to Secure Funds for Railway Construction without a Guarantee.

An attempt to secure the construction of railways in India, on terms more favourable to the Government than those of the contracts with the original guaranteed companies, was first made in 1862, when a subsidy, but not a guarantee, was granted to the Indian Branch Railway Company which proposed to make feeders to the trunk lines in Northern India, and did actually

make one such line. Similar assistance was granted later to the Indian Tramway Company, which made a short line in Madras. In 1864, the terms granted to the two companies mentioned were taken as a standard for general adoption with a view to the encouragement of similar companies. The chief provisions were that the Government, besides giving the necessary land free of costs, would grant an annual subsidy for 20 years at a rate not exceeding 100*l*. per mile of line, with an addition in respect of large bridges costing more than 10,000*l*. These terms failed to attract capital, and the two unguaranteed companies which had begun work found themselves after a few years unable to proceed without further assistance from the Government. Consequently, in 1867, a contract was entered into with the Indian Branch Railway Company (which soon after changed its name to the "Oudh and Rohilkhand Railway Company") by which the company was guaranteed interest at 5 per cent. per annum on the cost of certain lines to be carried out by it, on conditions similar to those laid down in the contracts of the period 1854—1860. Similarly, the Indian Tramway Company, after having been given in 1868 a guarantee of 3 per cent. per annum, went into liquidation in 1870, and became absorbed in a new company called the Carnatic Railway Company (afterwards amalgamated with the Great Southern of India Railway Company to form the South Indian Railway Company), with which the Secretary of State entered into a contract guaranteeing interest on its capital at 5 per cent. per annum. In 1869, Sir John Lawrence summed up the result of the experiment of the construction of railways by unguaranteed companies as follows :—" The Government of India has for several years been striving to induce capitalists to undertake the construction of railways in India at their own risk, and on their responsibility with a minimum of Government interference. But the attempt has entirely failed, and it has become obvious that no capital can be obtained for such undertakings otherwise than under a guarantee of interest fully equal to that which the Government would have to pay if it borrowed directly on its own account."

The attempt to encourage unguaranteed companies having thus been unsuccessful, it became necessary to decide whether the old practice of relying on guaranteed companies, of the type that had provided capital for, and had constructed, the first railways in India, should be continued. The Government of India expressed their objections to this course. They doubted whether their power of control over such companies secured the greatest possible economy in construction. They also disliked the arrangements under which they guaranteed the interest on the capital of companies, and thus became responsible for loss on working while having only a comparatively remote prospect of profiting by the result of successful working. Two important changes were consequently made in the practice that had been followed since the beginning of railway construction in India :—

1. Arrangements were made with some of the most important of the guaranteed companies that, in lieu of the provision that half of any surplus profits was to be applied in repayment of sums advanced by the Government under the guarantee of interest, half of the surplus profits for each half-year should be the property of the Government. In consideration of this modification, the Government relinquished, in the case of three companies, the Great Indian Peninsula, the Bombay, Baroda and Central India, and the Madras, its right to purchase the lines at the end of the first 25 years from the dates of the respective contracts.

2. It was decided by the Secretary of State that the time had arrived when in both raising and expending such additional capital as might be required for new lines in India, the Government should secure to itself the full benefit of its

own credit and of the cheaper methods which it was expected that it would be able to use. Accordingly, for several years after 1869, the chief capital expenditure on railways was incurred direct by the State and no fresh contracts with guaranteed companies were made except for small extensions. Among the lines constructed or begun by State agency and from State capital between 1869 and 1880 were the Indus Valley, Punjab Northern, Rajputana-Malwa, Northern Bengal, Rangoon and Irrawaddy Valley, and Tirhoot.

Progress in the Construction of Railways.

By the end of 1879, in about 25 years from the introduction of railways in India, 6,128 miles of railway had been constructed by companies which had expended, approximately, 97,872,000*l.* (these figures include the Calcutta and South-Eastern and Nalhati Railways, which were constructed by companies but were purchased by the Government in 1868 and 1872, respectively). By the same date 2,175 miles of railway had been constructed by the Government at a cost of 23,695,226*l.*

Introduction of Modified Guarantee Terms.

In 1880, the necessity for great and rapid extension of the railway system was urged by the Famine Commissioners, appointed after the great famine of 1878, who estimated that at least 5,000 miles were still necessary for the protection of the country from famine. It was held by the Government of the time that a limit was necessary on the capital borrowed annually; and it was clear that the limit fixed was not high enough to allow of such progress in railway construction as was desirable. With reference to this difficulty the Famine Commissioners remarked : "that there would be manifest advantages in giving free scope to the extension of railways by private enterprise if it were possible; and, though the original form of guarantee has been condemned, it may not be impossible to find some substitute which shall be free from its defects, and may secure the investment of capital in these undertakings without involving the Government in financial or other liabilities of an objectionable nature"

Action in the direction suggested by the Commission was taken by the formation of three companies without a guarantee (the Bengal Central in 1881 and the Bengal and North-Western and Rohilkund and Kumaon in 1882) and three new guaranteed companies (Southern Mahratta in 1882, the Indian Midland in 1885, and the Bengal-Nagpur in 1887). The Bengal and North-Western and the Rohilkund and Kumaon Railway Companies are referred to more fully in a later paragraph. The Bengal Central Railway Company's operations were not successful at the outset, and a revised contract was entered into with the company, with effect from the 1st July 1885, under which the Secretary of State guaranteed interest at 3½ per cent. on the company's capital, the balance of net earnings remaining after payment of interest on advances by the Secretary of State and debenture capital (but not the share capital) being divided between the Secretary of State and the company in the proportions of three-quarters to the former and one-quarter to the latter. The new contract gave the Secretary of State the right to take possession of the line on the 30th June 1905, or subsequently at intervals of 10 years, on repaying the company's capital at par. The rate of interest guaranteed to the Southern Mahratta Railway Company was also 3½ per cent. ; in this case the balance of net earnings remaining after payment of interest on advances by the Secretary of State (but not on share or debenture capital) was divisible in the same way as in the case of the Bengal Central Railway Company. The guarantee to the Indian Midland and Bengal-Nagpur Railway Companies was 4 per cent. ; and the Secretary of State was entitled to three-quarters of the surplus profits in excess of all interest charges. The lines constructed by the three companies last mentioned were declared to be the property of the Secretary of State, who had the right

to determine the contracts at the end of approximately 25 years after their respective dates, or at subsequent intervals of 10 years, on repaying at par the capital provided by the companies.

The Assam-Bengal Railway Company was formed on similar lines in 1892, except that any surplus profits were to be divided between the Secretary of State and the company in proportion to the capital provided by each. The rate of guarantee in this case was 3½ per cent. for the first six years and thereafter 3 per cent. The Burma Railways Company was formed in 1897 to manage and develop the line in that Province that had been constructed by the State. Interest at 2½ per cent. was guaranteed on the share capital raised by the company, and the surplus profits were originally divisible in the proportion of four-fifths to the Secretary of State and one-fifth to the company, but since 1908 the division has been proportional to the capital invested by each in the undertaking. The contract with the Burma Company is terminable by the Secretary of State in 1928, or on subsequent occasions, on repayment of the company's capital at par.

The terms of guarantee given to the companies formed since 1880 have thus been much more favourable to the Government than in the case of those formed before 1869.

Termination of Contracts of the Old Guaranteed Companies.

In dealing with the guaranteed companies formed before 1869 and with those formed in 1881 and subsequently, it has been the practice (except in the cases mentioned above, when the purchase of some of the old guaranteed lines was postponed in order to secure to the Government a share in surplus profits) to use in some way or other at the earliest possible date the right reserved by the Government of terminating the contracts of the various companies. The method of making use of this right has differed in different cases. The Eastern Bengal, Oudh and Rohilkhand, and Scinde-Punjab and Delhi lines were purchased and transferred to State management, the last named now forming part of the North-Western Railway. Similarly, the Bengal Central line was purchased and made part of the Eastern Bengal Railway. The Madras and the Indian Midland lines were acquired but left, after acquisition, under the management of companies working other lines with which it was advantageous to amalgamate them. In all other cases (East Indian, South Indian, Great Indian Peninsula, Bombay, Baroda and Central India, Southern Mahratta, and Bengal-Nagpur), the course adopted has been to arrange for the continuance of management by the original company (or by a new company closely related to the old one), but to secure more favourable financial conditions for the State by one or more of the following methods:—reduction of the amount of capital retained by the companies in the undertakings, reduction of the rate of interest guaranteed by the State on such capital, and modification in favour of the Government of the clauses relating to the division of surplus profits.

Arrangements Between the Government and Companies at present.

The relations between the Government and the guaranteed companies now working railways may be summarised as follows:—

The lines that they work are the property of the State.

The greater part of the capital is the property of the Government, either through having been originally supplied by it or through the acquisition by the Government of the greater part of the companies' interests on the termination of old contracts.

When funds are required for further capital expenditure, the Government has the option either of providing them or of calling on the company to provide them. The

company receives guaranteed interest at a fixed rate on its capital ; and similar payments out of the earnings are made to the Government. If, after these have been made, surplus profits remain, they are divided between the Government and the company in the various proportions provided for by the contracts. The company's share is in all cases only a small fraction of the Government's share.

All the contracts, except one, which is for a fixed term of 25 years, are terminable at the option of the Secretary of State, at specified dates; and on termination the company's capital is repayable at par (except in the case of the East Indian Railway Company, which is for special reasons to receive a terminable annuity instead of a cash payment).

The administrative control exercised by the Government over the companies is as follows :—

The company is bound to keep the line in good repair, in good working condition, and fully supplied with rolling-stock, plant, and machinery ; to keep the rolling-stock in good repair and in good working condition ; and to maintain a sufficient staff for the purposes of the line ;—all to the satisfaction of the Secretary of State.

The Secretary of State may require the company to carry out any alteration or improvement in the line, or in the working that he may think necessary for the safety of the public or for the effectual working of the line.

The Secretary of State may require the company to enter into agreements, on reasonable terms and conditions, with the administrations of adjoining railways for the exercise of running powers, for the supply to one another of surplus rolling-stock, for the interchange of traffic and rolling-stock and the settlement of through rates, and for additions and alterations to, or the redistribution of, existing accommodation in junctions or other stations in view to their convenient mutual use.

The train service is to be such as the Secretary of State may require. In order to secure a general control over the rates quoted by companies the Secretary of State has retained power to settle the classification of goods and to authorise maximum and minimum rates within which the companies shall be entitled to charge the public for the conveyance of passengers and goods of each class.

The company has to keep such accounts as the Secretary of State may require, and these are subject to audit by the Secretary of State.

In all other matters relating to the line the company is made subject to the supervision and control of the Secretary of State, who may appoint such persons as he may think proper for the purpose of inspecting the line, auditing the accounts, or otherwise exercising the power of supervision and control reserved to him. In particular, the Secretary of State has the right to appoint a Government Director to the Board of the company, with a power of veto on all proceedings of the Board. All the moneys received by the company in respect of the undertaking, whether on capital or revenue account, have to be paid over to the Secretary of State.

All expenditure by the company has to be stated and submitted for the sanction of the Secretary of State.

Thus, the Government has the preponderating financial interest in the lines worked by the two classes of guaranteed companies, those formed before 1869 and retained as working agencies with reduced capital after purchase, and those formed on terms more favourable to the State after 1880; it has exceedingly wide control over the methods of working; and it has the right of taking possession of the lines at specified times on repayment at par of the capital of the companies.

Other Lines Worked by Companies.

In addition to the lines referred to above, and apart from lines constructed by branch line companies, District Boards and Indian States, two lines of some importance have been constructed by companies which receive no direct assistance by the Government, namely, the Bengal and North-Western Railway and the Rohilkund and Kumaon Railway. (The Rohilkund and Kumaon Railway Company was guaranteed interest at 4 per cent. during construction and received for 10 years thereafter a subsidy of Rs. 20,000 per annum. This ceased in 1894.) While, however, these companies have no guarantee or other direct payment from the Government, they derive some advantage (partly through direct participation in profits and partly through reduction of expenses) from the fact that the working of certain State lines has been entrusted to them, the Tirhoot Railway to the former company and the Lucknow-Bareilly Railway to the latter. Their lines can be purchased by the State in 1932 on terms which are different in respect of the different sections of the lines, but are, on the whole, much more favourable to the companies than those provided for in the contracts with the guaranteed companies. Failing purchase in 1932, the lines will become the property of the State in 1981 on terms much less favourable to the companies. The general administrative control exercised by the State over these companies and the control over expenditure are similar to that which is exercised, as explained above, over guaranteed companies.

Controlling Authority.

The greater number of the powers for the detailed control of railways as described in the foregoing paragraphs are vested in the Railway Board. The Board consists of a President and two Members with a Secretariat establishment.

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